ACCESSION NR: AP4041587 S/0078/64/009/007/1662/1668

AUTHOR: Ko, Chih-ming; Kornilov, I. I.; Py*layeva, Ye. N.

TITLE: Phase diagram of titanium-aluminum-molybdenum-vanadium system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 7, 1964, 1662-1668

TOPIC TAGS: titanium aluminum alloy, molybdenum containing alloy, vanadium containing alloy, alloy phase composition, alloy structure, alloy property

ABSTRACT: Sixty-nine alloys of the Ti-Al-(Mo:V = 1:1) system with an Al + Mo + V content of up to 50% were levitation melted in an atmosphere of purified helium from iodide titanium, 99.99% pure aluminum, 99.9% pure molybdenum, and 99.3% pure vanadium, and studied by microscopic, x-ray diffraction, and dilatometric analysis, and by measurement of the hardness and electrical resistivity. Alloys were investigated in the as-cast condition and also after heat treatment. Isothermal sections of the Ti-Al-(Mo:V = 1:1) system, plotted on the basis of the microscopic and x-ray phase analyses, showed the following phases and phase regions to be in equilibrium: α, β, γ,

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ACCESSION NR: AP4041587

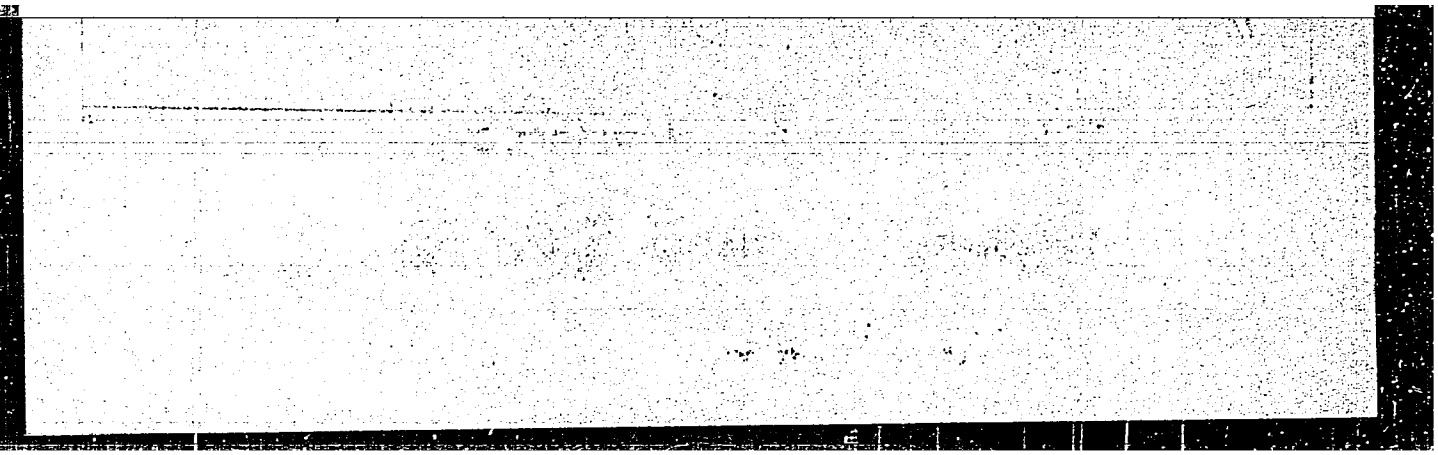
α+β, α+γ, β+γ, and α+β+γ. The data of the microscopic, x-ray, and dilatometric examinations were used to plot the polythermal sections of the system through the titanium corner and at Al to (Mo + V) weight-concentration ratios of 0:100, 15:85, 25:75, 50:50, 75:25, and 85:15. Examination of the plotted composition-hardness and composition-electrical resistivity diagrams showed that the hardness and electrical resistivity of most alloys increase with increasing summary concentration of Al, Mo, and V. The data on the electrical resistivity and hardness of alloys, quenched from 600C, also show the existence of the Ti_3Al compound in the Ti-Al-Mo-V system. Orig. art. has: 7 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 07May63 ATD PRESS: 3067 ENCL: 00

SUB CODE: MM NO REF SOV: 006 OTHER: 000

Card 2/2



APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001343730004-6"

met 2-

J of the Inst. of Metals
Feb. 1954
Properties of Alloys

Separation of Nickel Tantalide, Ni_3Ta, from Alloys of the Binary System Nickel-Tantalum. I. I. Kornilov and E. N. Pylaeva (*Doklady Akad. Nauk S.S.S.R.*, 1953, 91, (4), 841–843).—[In Russian]. By heating *in vacuo* at 1300° C. for 4 hr., at 1200° C. for 2 hr., at 1000° C. for 2 hr., and then slowly cooling to room temp., K. and P. produced a considerable coarsening of the Ni_3Ta phase (present as elongated crystals) in the two-phase alloy of Ni with 39·15% Ta. They found that 5% HCl contg. 2–3 drops HNO_3 was best for dissolving the Ni solid soln. without attacking the Ni_3Ta. With 0·2–0·5 g. alloy in a 100-ml. beaker, dissoln. began only on warming, but then continued very slowly in the cold for 2–3 days, with occasional agitation. The residue was dried with alcohol and ether and observed microscopically. Greater amounts were prepared by electrolytic dissoln., using as anode a polished rod of the alloy 50 × 3 mm. dia. in a colloid bag, centred with relation to the tinplate beaker, 9 cm. high × 8 cm. wide, acting as cathode. The electrolyte was 0·75% alcoholic HCl + 20 g. citric acid + 5 g. NH_4Cl, and the c.d. 0·01 amp./cm.^{2} (at greater c.d. there was anodic oxidation, so that the product contained oxide and salts). 0·5 g. powder was obtained in 1 hr. On analysis by dissolving in $HF + HNO_3$, removing HF by heating with H_2SO_4, precipitating Ta with NH_4OH in the presence of NH_4Cl, and weighing as Ta_2O_5, the powder was found to contain 49·44% Ta (cf. 50·70% for Ni_3Ta theoretically).—G. V. E. T.

PYLAYEVA, Ye. N.

"An Investigation of the Structural Diagram of the Trinary System Ni - Ni_3 Nb - Ni_3 Ta." Cand Tech Sci, Inst of Metallurgy imeni A. A. Baykov, 6 Dec 54. (VM, 24 Nov 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (11)

SO: Sum. No. 521, 2 Jun 55

PYLAYEVA, Ye. N.

PYLAYEVA, Ye. N.

USSR/ Chemistry - Metallurgy

Card : 1/1

Authors : Kornilov, I. I. and Pylaeva, E. N.

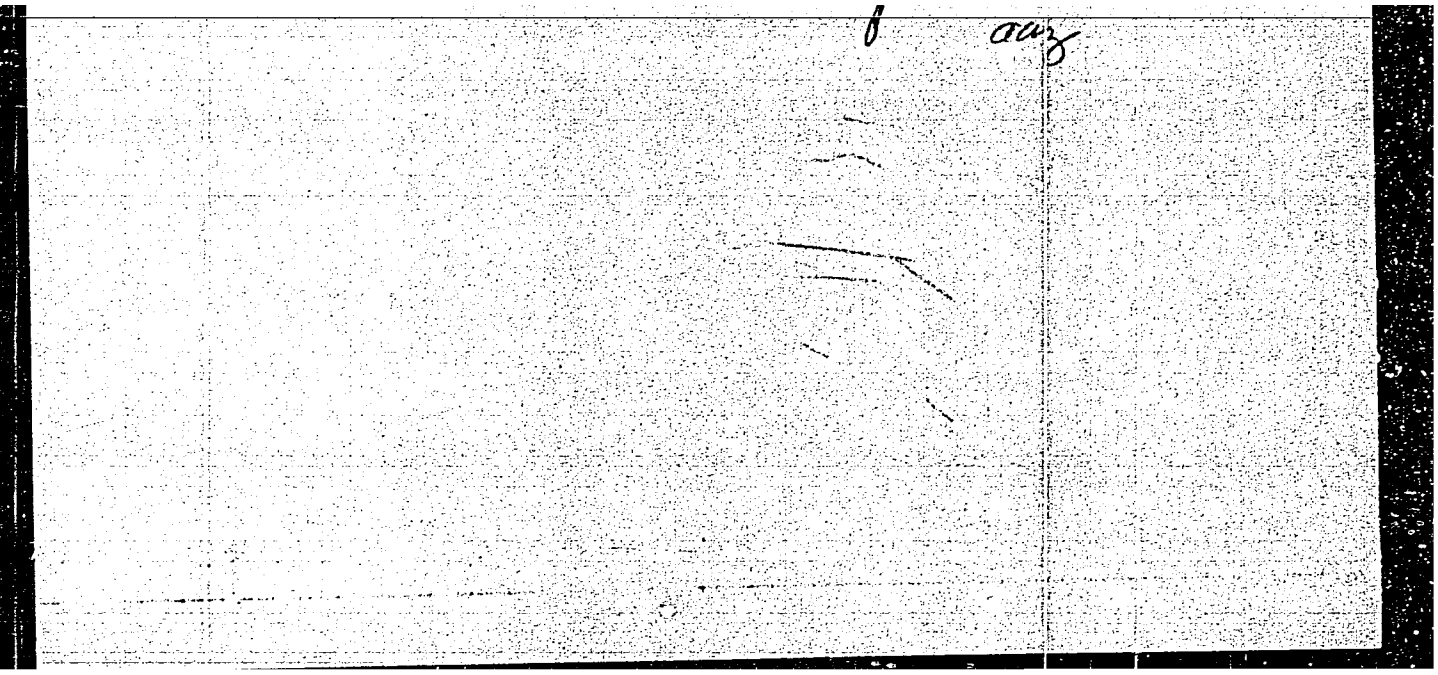
Title : Study of the structural diagram of a system formed by metallic Ni_3Nb-Ni_3Ta compounds.

Periodical : Dokl. AN SSSR, 97, Ed. 3, 455 - 457, July 21, 1954

Abstract : The study and formation of a structural diagram, for a binary system formed by metallic Ni_3Nb and Ni_3Ta compounds, are discussed. The study of this system was carried out by methods of thermal analysis, microstructure, specific electrohardness resistance and specific weight. Many fusions of this binary system were also subjected to x-ray analysis and the total results are described. Eight references: 6-USSR and 2-USA. Graph, illustrations.

Institution : Acad. of Sc. USSR, The A. A. Baykov Institute of Metallurgy

Presented by : Academician I. P. Bardin, March 26, 1954



PYLAYEVA, YE. N.

USSR/Physical Chemistry - Thermodynamics. Thermochemistry. Equilibrium. Physicochemical Analysis. Phase Transitions, B-8

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 365

Author: Kornilov, I. I., and Pylayeva, Ye. N.

Institution: None

Title: Investigation of the Phase Diagram of the Ternary System Ni-Ni_3Nb-Ni_3Ta

Original Periodical: Zh. neorgan. khimii, 1956, Vol 1, No 2, 308-316

Abstract: The phase diagram for the ternary system Ni(I)-Ni_3Nb(II)-Ni_3Ta(III) was studied. A phase diagram has been constructed for the binary system formed by the metallic compounds II and III, and it is shown that it represents a continuous series of solid solutions. The phase diagram for I-II-III has been investigated along 3 radial sections from the nickel corner to the quasi-binary cross section II-III. On the basis of the data obtained by thermic analysis, microstructure studies, and hardness and conductivity studies on the melts, it has

Card 1/2

USSR/Physical Chemistry - Thermodynamics. Thermochemistry. Equilibrium. Physico-chemical Analysis. Phase Transitions, B-8

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 365

Abstract: been established that the phase diagram for I-II-III is characterized by limited solid state solubility with a continuous transition from the binary eutectic I-II to the binary eutectic of the system I-III. It is shown that the joint solubility of Nb and Ta decreases continuously as the temperature is reduced from the crystallization temperatures of the ternary alloys to room temperature.

Card 2/2

PYLAYEVA, Ye. N.

Category: USSR / Physical Chemistry
Thermodynamics. Thermochemistry. Equilibrium. Physico-chemical analysis. Phase transitions. B-8

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29931

Author : Kornilov I. I., Pylayeva Ye. N., Volkova M. A.
Inst : Academy of Sciences USSR
Title : Diagram of State of Binary System Titanium - Aluminum

Orig Pub: Izv. AN SSSR, Otd. khim, n., 1956, No 7, 771-778

Abstract: Investigation of the diagram of state of Ti - Al system, by thermal, microstructure and x-ray diffraction methods, and also by means of analysis of hardness and heat-resistance. Occurence of peritectic transformations has been ascertained at 1520° (beta) + melt $\rightleftharpoons$ gamma and at 1400° (gamma + melt $\rightleftharpoons$ Ti Al_3) and also that of a peritectoidal reaction at 1300° (beta + gamma $\rightleftharpoons$ alpha). Solubility of Al in Ti at 1200° and 800° is, respectively, of 26 and 21.6%. Solid solutions of Al in Ti, located near the boundary of maximum solubility of Al in Ti, have highest durability at high temperature (at 550° and 15 kg/mm^2).

Card : 1/1

PYLAYEVA, Ye.N.

137-58-4-8440

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 303 (USSR)

AUTHORS: Kornilov, I.M., Pylayeva, Ye.N., Volkova, M.A.

TITLE: Phase and Heat Resistance Diagram of Alloys of the Ti-Al Binary System (Diagramma sostava - zharoprochnost' splavov dvoynoy sistemy Ti-Al)

PERIODICAL: Tr. In-ta metallurgii AN SSSR, 1957, Nr 2, pp 164-166

ABSTRACT: The heat resistance and change in lattice spacing of Ti in Ti-Al alloys having up to 27.5% Al is studied. The curves of the relationship between Ti lattice spacings and Al content differ in the single-phase and double-phase regions, and the values of the a and c spacings diminish as Al content rises. The centrifugal method was employed to investigate the heat resistance, tests being run at 550°C and stresses of $\sigma = 15$ kg/mm^2 for 250 hours and then at 600° and the same σ for 50 hours. The specimens were made by sintering Ti powders. The criterion of heat resistance employed was the time required to attain a given bending deflection, namely, 2 and 4 mm (the latter in the case of pure Ti). The bending deflection of alloys from the region of solid Al solutions under analysis and of alloys in the heterogen-

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Phase and Heat Resistance Diagram of Alloys of the Ti-Al Binary System

eous region ($\alpha+\beta$) rises rapidly in the process of deformation. As the concentration of Al in the solid solution rises, the bending deflection diminishes sharply (alloys with 2.5-5% Al bend 6 mm after 250 hours, while those with 7.5-20% Al bend 2-3 mm). Alloys in the biphasic region are brittle and less heat resistant than Ti and alloys from the region of solid solutions. Comparison of the curves of bending deflection for various alloys with the phase diagram and with the change in the lattice spacing shows that in the Ti-Al binary system a definite relationship exists at 550-600° between the heat resistance, the composition, and the structure of the alloys: heat resistance exists within the bounds of a limited solid-solution range of Al content. Maximum heat resistance is observed in high-content solid Ti solutions. The compositions of alloys in the transition zone from solid solutions to the biphasic region show higher heat resistance than pure Ti, the solid solutions studied, or alloys unmistakably in the biphasic region.

V.G.

1. Aluminum-titanium alloys--Phase studies 2. Aluminum-titanium alloys --Temperature factors

Card 2/2

PYLAYEVA, Ye.N.

KORNILOV, I.I.; PYLAYEVA, Ye.N.

Study of the Ni_3Ti - Ni_3Ta, Ni_3Ti - Ni_3Nb binary systems. Zhur. neorg.khim. no.3:673-677 '58. (MIRA 11:4)

1.Institut metallurgii im. A.A. Baykova Akademii nauk SSSR.
(Nickel-titanium-tantalum alloys)
(Nickel-titanium-niobium alloys)

AUTHORS: Kornilov, I. I., Pylayeva, Ye. N., Volkova, M. A. 76-3-6-17/30

TITLE: II. Investigations of Equilibrium in the Ternary System Ti-Al-Fe (II. Issledovaniye ravnovesiya v troynoy sisteme Ti-Al-Fe)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 6, pp. 1391-1397 (USSR)

ABSTRACT: The ternary system Ti-Al-Fe, especially in the angle of titanium of up to 30 % of the sum Al+Fe, was investigated by means of thermal, micro-structural - and X-ray analysis.

The alloys produced were investigated with respect to their hardness and temperature-stability. The solid solution of aluminum and iron covers a vast range in β-titanium at 1100°C.
The phase-compositions were investigated at temperatures of 1100, 1000, 800 and 550°C. A large part of the alloys undergoes eutectoid transition into solid solutions like in the systems Ti-Fe: $\beta \rightarrow \alpha + TiFe$.
The occurence of the β-phase in the biphase-range α+TiFe

Card 1/2

increases according to the increase in temperatures of from 680°C to 850°C, according to the increase of the aluminumcontent in the alloys.
In the ternary system Ti-Al-Fe the γ-phase dissipates at 1100°C of from 40 % to 47 % Al. The maximum solubility of iron in this phase amounts to approximately 1,5 %.
A decrease in the hardness of the alloys takes place in the range of the γ-solid solution in the ternary system Ti-Al-Fe. The alloys with γ-phase retain their hardness when heated up to a temperature of 700°C, whereas at temperatures of from 700 to 950°C the hardness of the alloys decreases to a smaller extent than in titanium alloys on the basis of the α-phase.
There are 17 figures, and 13 references, 4 of which are Soviet.

SUBMITTED: June 26, 1957

AVAILABLE: Library of Congress

Card 2/2 1. Aluminum-iron-titanium alloys--Phase studies 2. Aluminum-iron-titanium alloys--Production

AUTHORS: Pylayeva, Ye.N., Gladyshevskiy, Ye.I., Krypyakevich, P.I. SOV/ 78-3-7-28/44

TITLE: The Crystalline Structure of the Compounds Ni_3Nb and Ni_3Ta (Kristallicheskaya struktura soyedineniy Ni_3Nb i Ni_3Ta)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 7, pp 1626-1631 (USSR)

ABSTRACT: The metallic compounds Ni_3Nb and Ni_3Ta and 9 ternary alloys of the series Ni_3Nb-Ni_3Ta were investigated with respect to their structure by the X-ray method. The results obtained showed that the compounds Ni_3Nb and Ni_3Ta belong to the structural type β-Cu_3Ti. The structural arrangement of atoms is the following: 2 Nb (or Ta) in (a) with $Z_a = 2/3$
2 Ni in (b) with $Z_b = 1/3$, 4 Ni in (f) with $x = 1/4$; $Z_f = 1/6$.
The lattice constant for the compound Ni_3Nb are the following:
$a = 5.10$, $b = 4.24$, $c = 4.53$ Å
The ratio a : b : c = 2 : 1,66 : 1,78
For the compound Ni_3Ta the lattice constants are as follows:

Card 1/2

The Crystalline Structure of the Compounds Ni_3Nb and Ni_3Ta SOV/ 78-3-7-28/44

a = 5.09, b = 4.23, c = 4.51 Å, a : b : c = 2 : 1.66 : 1.77. The compounds Ni_3Nb and Ni_3Ta together form continuous series of solid solutions. There are 2 figures, 2 tables and 5 references, 3 of which are Soviet.

ASSOCIATION: Institut metallurgii im. A.A.Baykova Akademii nauk SSSR i L'vovskiy gosuniversitet im. I.Franko
(Institute of Metallurgy imeni A.A.Baykov, AS USSR and L'vov State University imeni I.Franko)

SUBMITTED: June 18, 1957

1. Intermetallic compounds--Crystal structure 2. Intermetallic compounds--Atomic structure 3. Intermetallic compounds--X-ray analysis 4. Intermetallic compounds--Lattices

Card 2/2

GE CHIH-MIN [Ko Chih-ming]; KORNILOV, I.I.; PYLAYEVA, Ye.N.

Phase equilibrium diagram of the system Ti - Al - (Mo:V=1:1).
Zhur. neorg. khim. 9 no.7:1662-1668 Jl '64. (MIRA 17:9)

ACC NR: AT6012375 SOURCE CODE: UR/0000/65/000/000/0092/0097

AUTHORS: Kornilov, I. I. (Doctor of chemical sciences, Professor); Volkova, M. A.; Pylayeva, Ye. N.

ORG: none

TITLE: Investigation of the alloys of the ternary system Ti--Al--V

SOURCE: Soveshchaniye po metallokhimii, metallovedeniyu i primeneniyu titana i yego splavov, 6th. Novyye issledovaniya titanovykh splavov (New research on titanium alloys); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 92-97

TOPIC TAGS: titanium, aluminum, vanadium, alloy phase diagram, ternary alloy, hardness

ABSTRACT: The alloys of the system Ti-Al-V were studied. The experimental results supplement an earlier investigation by I. I. Kornilov, Ye. N. Pylayeva, M. A. Volkova, P. I. Kripyakevich, and V. Ya. Markiv (Nastoyashchiy sbornik, str. 48). The experiments were carried out with titanium iodide (99.7% Ti), AV000 aluminum (99.99%) and carbothermal vanadium (99.5% V). The phase diagrams of the system and the microstructure, hardness, and electrical resistance of the alloys were determined. Experimental results are presented graphically (see Fig. 1). The minimum hardness and electrical resistance of alloys containing 15--16% Al and an Al/V ratio of 3:1 are due to the formation of a solid solution on the basis of the compound Ti_3Al in the ternary system.

Card 1/3

ACC NR: AT6012375

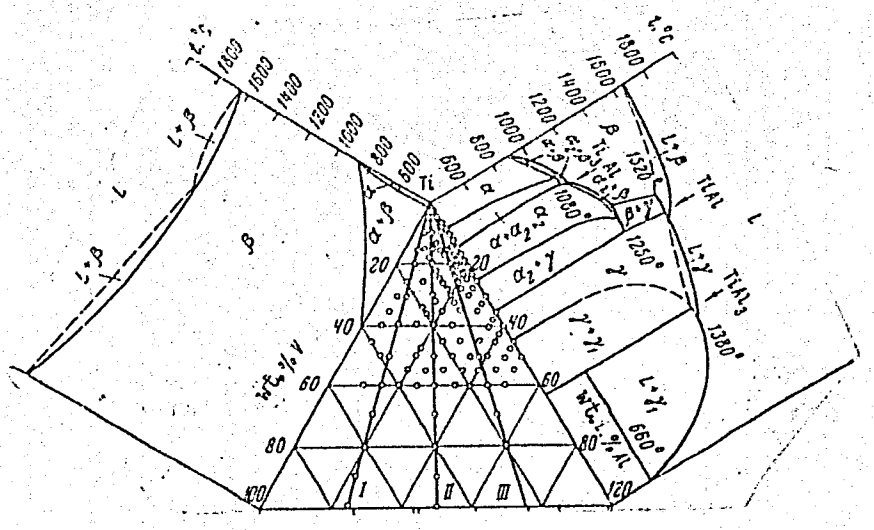
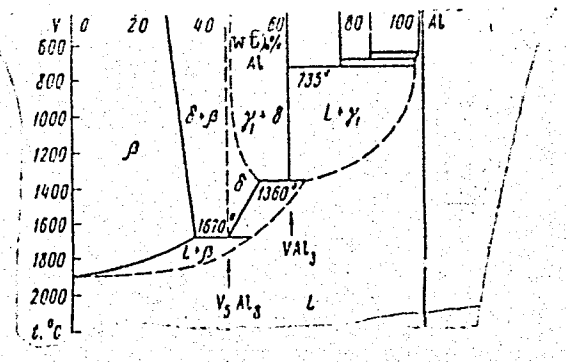


Fig. 1. Composition triangle of the ternary system Ti--Al--V.

Card 2/3

ACC NR: AT6012375



Orig. art. has: 6 figures.

SUB CODE: 11/ SUBM DATE: 02Dec65/ ORIG REF: 002/ OTH REF: 005

Card 3/3

L 55[illegible]-66 EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6013367 SOURCE CODE: UR/0370/66/000/002/0137/0143

AUTHOR: Kornilov, I. I. (Moscow); Pylayeva, Ye. N. (Moscow); Volkova, M. A. (Moscow)

ORG: none

TITLE: Evaluation of the creep of alloys of the Ti-Al-V system by the bending method at elevated temperatures

SOURCE: AN SSSR. Izvestiya. Metally, no. 2, 1966, 137-143

TOPIC TAGS: creep, titanium alloy, vanadium alloy, aluminum alloy

ABSTRACT: Continuing their study of the high-temperature strength of titanium alloys, the authors investigated it in the ternary system Ti-Al-V as a function of alloy composition and structure. An isothermal section of the system at 550°C was plotted on the basis of microstructural and x-ray analyses and a determination of the properties; the regions of the α and β solid solutions of titanium and of the intermetallic compound Ti_3Al (α_2 phase) are indicated (see Fig. 1). Alloys of the Ti-Al-V system along sections with constant aluminum contents of 5, 7.5, and 20% were found to have a maximum creep resistance near the boundary of the limiting solutions based on α Ti, β Ti, and Ti_3Al; the lowest high-temperature strength is displayed by alloys from the regions ($\alpha + \beta$) and ($\alpha_2 + \beta$) with a coarse two-phase structure. Alloys from the region of the γ phase have a high creep resistance at

Card 1/2 UDC: 669.017.13

Card 2/2 MLP

L 27502-66 EWT(m)/T/EWP(t)/ETI IJP(c) JH/JD/GS

ACC NR: AT6012369 SOURCE CODE: UR/0000/65/000/000/0048/0055

AUTHORS: Kornilov, I. I. (Doctor of chemical sciences, Professor); Volkova, M. A.; Pylayeva, Ye. N.; Kripyakevich, P. I.; Markiv, V. Ya.

ORG: none

TITLE: Investigation of equilibrium diagrams of titanium-rich alloys of the system Ti--Al

SOURCE: Soveshchaniye po metallokhimii, metallovedeniyu i primeneniyu titana i yego splavov, 6th. Novyye issledovaniya titanovykh splavov (New research on titanium alloys); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 48-55

TOPIC TAGS: titanium, aluminum, alloy phase diagram, titanium alloy, binary alloy, lattice parameter

ABSTRACT: The phase diagram of the binary system Ti-Al (containing up to 30% Al) was determined. The diagram was constructed on the basis of thermal, microstructural, dilatometrical, and x-ray analysis. In addition, the specific electrical resistance and hardness of the alloy specimens were determined. The investigation supplements earlier work of N. V. Grum-Grzhimaylo, I. I. Kornilov, Ye. N. Pylayeva, and M. A. Volkova, (Dokl. AN SSSR, 1961, 137, No. 3, 599). The experimental results are summarized in graphs and tables (see Fig. 1) and compared to earlier literature data. A rearrangement takes place in the alloys in the temperature region from 882 to 1250C. These temperatures correspond to a transition from a hexagonal close-packed structure

Card 1/3

L 27502-66

ACC NR: AT6012369

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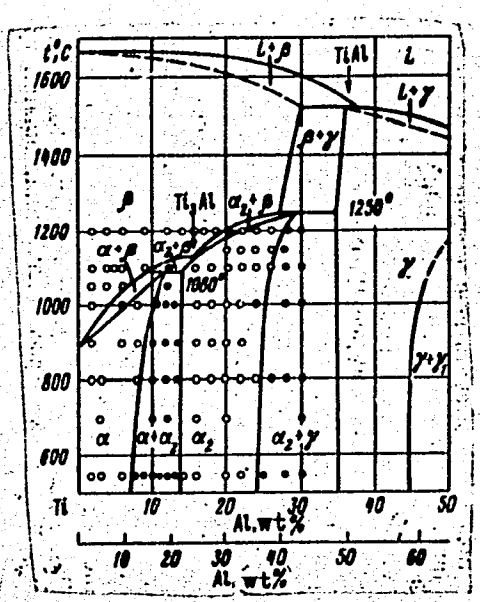

Fig. 1. Phase diagram of the system Ti--Al.

to a body-centered structure. The curves for the properties of alloys vs composition exhibit a minimum, the composition of which corresponds to the intermetallic compound Ti_3Al. The existence of the compound Ti_3Al was corroborated by x-ray analysis. The structure of Ti_3Al was found to resemble the Mg_3Cd structure. The lattice parameter

Card 2/3

L 27502-66

ACC NR: AT6012369

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of the system Ti-Al was determined as a function of the composition (see Fig. 2).

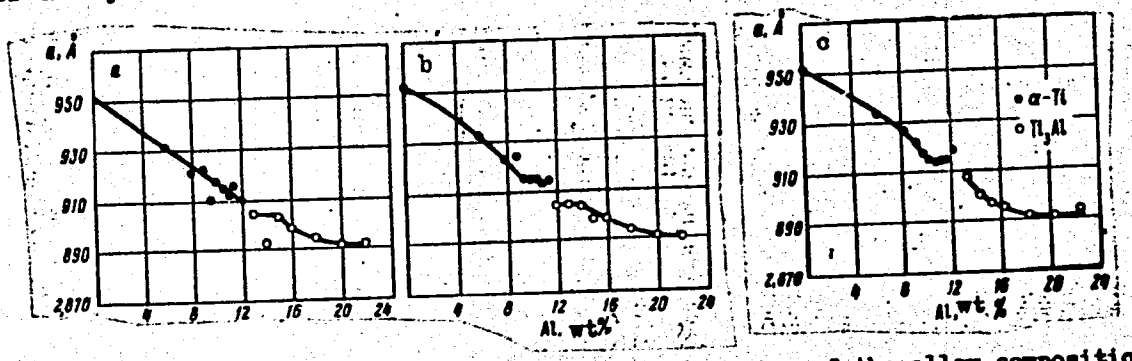


Fig. 2. Dependence of the lattice parameter of the alloy composition of the system Ti--Al annealed at 950C (a), 700C (b), and 550C (c).

Orig. art. has: 1 table and 6 figures.

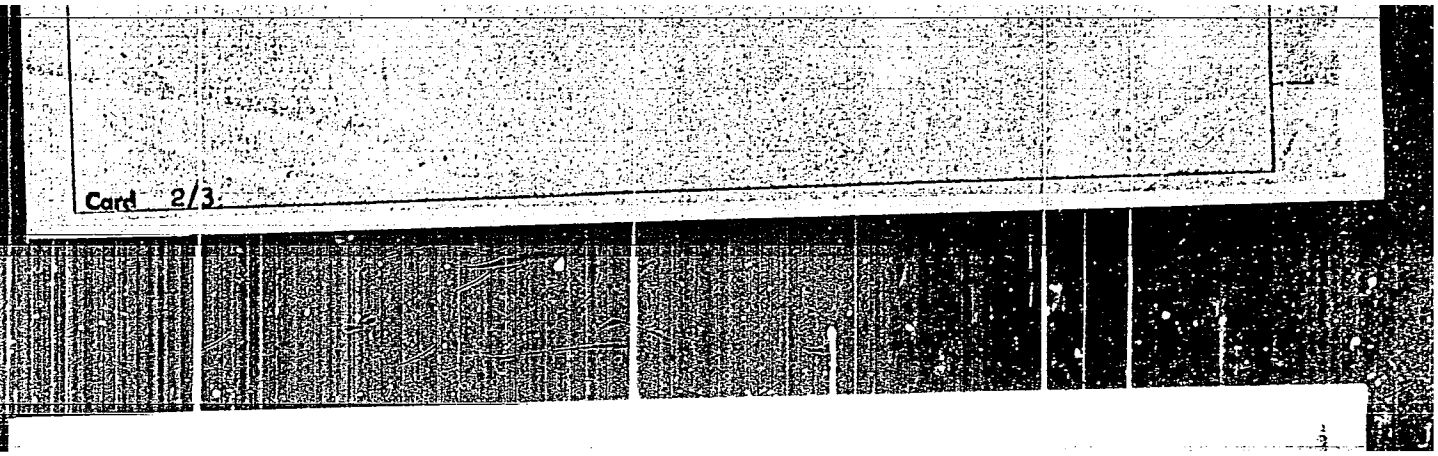
SUB CODE: 11/ SUBM DATE: 02Dec65/ ORIG REF: 006/ OTH REF: 004

Card 3/3 BLG

SOURCE: AN SSSR. Doklady, v. 161, no. 4, 1965, 843-846

TOPIC TAGS: titanium aluminum system, titanium alloy, aluminum containing alloy, alloy phase composition, alloy resistivity, alloy hardness

ABSTRACT: Binary Ti-Al alloys containing from 0 to 30% Al, levitation melted or arc melted in an inert gas atmosphere, were investigated in as-cast condition or deformed at 800—1000C with a reduction of 30%. The thermal analysis data showed that all alloys undergo the solid state transformation from a c.p.h. to b.c.c. structure. Microscopic examination and x-ray diffraction patterns revealed the following phases, (solid solutions): β—on a β-Ti base, α—on an α-Ti base, α_2—on a base of the ordered tetragonal structure of Ti_3Al compound of the Mg_3Cd type. Results of the measurements of the resistivity and hardness closely corresponded to one another and confirmed the results of the thermal, metallographic, and x-ray analysis. A phase diagram of the investigated Ti-Al system based on the results obtained is shown in Fig. 1 of the Enclosure. Orig. art. has: 3 figures. [MS]



L 15002-65 EWT(m)/EPF(n)-2/EWP(t)/EWP(b) Pu-4 ASD-3/APTC/ESD-3/SSD/IDA(c)/
ASD(m)-3 JD/JG/MLK

ACCESSION NR: AT4048078 S/0000/64/000/000/0236/0239

B+1

AUTHOR: Py*layeva, Ye. N., (Candidate of technical sciences); Ko, Chih-ming

TITLE: Heat resistance of Ti-Al-Mo-V alloys

SOURCE: Soveshchaniye po metallurgii, metallovedeniyu i primeneniyu titana i yego splavov. 5th, Moscow, 1963. Metallovedeniye titana (Metallography of titanium); trudy* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 236-239

TOPIC TAGS: titanium alloy, titanium alloy heat resistance, aluminum containing alloy, molybdenum containing alloy, vanadium containing alloy

ABSTRACT: The authors investigated the heat resistance of Ti-Al-Mo and Ti-Al-(Mo: V=1:1) alloys depending on composition and structure. The hot hardness method and centrifugal bending method were used. For the first test, a load of 1 kg was used with 1, 5, 10 and 20 minutes of deformation. The bending stress for the second method was [illegible] temperatures from 550 to 800C, depending on the aluminum

similar pressure on the sample, from which the relative heat

Card 1/2

L 15662-65

ACCESSION NR: AT4048078

The maximal heat resistance at 600-800C was given by a composition near the boundary of molybdenum solubility in the α-solid solution. When the Mo content was below 5%,

ASSOCIATION: none

SUBMITTED: 15Jul64 ENCL: 00 SUB CODE: MM

NO REF SOV: 005 OTHER: 000

Card 2/2

APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001343730004-6"

L 14307-65 EPF(n)-2/EPF / SWT(m)/EWP(b)/EWP(t) Pe-4/Pu-4 ASD(m)-3/
AFTC(p) WW/JD/JG/MLK
ACCESSION NR: AT4048049 S/0000/64/000/000/0038/0042

AUTHOR: Py*layeva, Ye. N., Volkova, M. A. B

TITLE: A study of the alloys of the ternary Ti-Al-Zr system

SOURCE: Soveshchaniye po metallurgii, metallovedeniyu i primeneniyu titana i yego splavov. 5th, Moscow, 1963. Metallovedeniye titana (Metallography of titanium); trudy* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 38-42

TOPIC TAGS: alloy structure, alloy phase composition, titanium alloy, aluminum alloy, zirconium alloy, alloy hardness

ABSTRACT: Although the Ti-Al-Zr system should produce a broad cross section of solid solutions which could be the bases for high-temperature alloys, data on this subject are totally lacking. For the preparation of samples, sponge titanium, aluminum and zirconium of the highest purity were used. The Ti-Al ratio was kept at 6:1 to facilitate the formation of Ti_6Al. The amount of Ti_6Al was varied from 100% by weight to 0, while the amount of zirconium was increased from 0 to 100%. Samples were heated to temperatures ranging from 1200 to 500C and held there for periods ranging from 6 to 750 hours, respectively. Heating was done by an arc furnace in an argon atmosphere. Since the

Card 1/2

weight difference of the samples was never more than 0.5%, no chemical analysis was performed. Microstructural and thermal analyses were performed on each sample. The specific electrical resistance and hardness were determined. The results of tests on samples containing the usual 6:1 ratio of titanium to aluminum and having less than 10% by wt. zirconium, when heated to 500C, showed that the samples contained a new solid solution of $\alpha + \alpha_2$ form. All alloys of this type undergo polymorphic transformations, analogous to the transformation of pure titanium and zirconium in the Ti-Zr system, in which the transformation may be pinpointed at the minimum on the temperature vs. composition curve, i.e. at 660C and 65% Zr. The specific electrical resistance and hardness, determined from tests on samples which were quenched from temperatures of 1100, 800, and 500C, follow an increasing curve: the hardness reaches a maximum

in samples cooled from a composition which produces a β-solid solution. Orig. art. has: 4 graphs, 1 table and 5 photomicrographs.

ASSOCIATION: None

SUBMITTED: 15Jul64 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 004

Card 2/2

KORNILOV, I.I.; PYLAYEVA, Ye.N.; VOLKOVA, M.A.

Review of the investigation of the constitutional diagram of the binary system Ti - Al. Titan i ego splavy no.10:74-85 '63. (MIRA 17:1)

GE CHZHI-IN [Ko Chih-ming]; PYLAYEVA, Ye.N.

Investigating the phase equilibrium in the system Ti - Al - Mo in the region of titanium-rich alloys. Titan i ego splavy no.10:14-21 '63.

Investigating phase transformations in the system Ti - Al - Mo. Ibid.:22-26

(MIRA 17:1)

KORNILOV, I.I. (Moskva); SHINYAYEV, A.Ya. (Moskva); PYLAYEVA, Ye.N. (Moskva)

Creep of certain metal compounds. Izv. AN SSSR. Met. i gor. delo no.5:113-115 S-O '63. (MIRA 16:11)

S/078/63/008/002/003/012
B101/B186

AUTHORS: Ko Chih-ming, Kornilov, I. I., Pylayeva, Ye. N.

TITLE: Investigation of the phase diagram of the system titanium-aluminium-molybdenum in the titanium-rich alloying regions

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 8, no. 2, 1963, 366 - 372

TEXT: The present study belongs to a series of investigations of the quaternary system Ti-Al-Mo-V. In order to obtain missing data the solidus isotherms of alloys of the system Ti-Al-Mo containing (% by weight) 55 - 95 Ti, 5 - 35 Al and 0.5 - 40 Mo were plotted. Using these and data relating to the microstructure and X-ray analysis, nine polythermal cross-sections and three isothermal cross-sections were plotted. Results: Alloys rich in titanium melt at 1700°C. The m.p. rises to 2000°C with 50% Mo, whereas it falls to 1400°C with high aluminium content. Increasing molybdenum content causes the temperature of the $\alpha \rightleftarrows \beta$ transitions to drop, increasing aluminium content raises it. With 5 to 10% Al content the polythermal cross-section passes through the crystallization regions of the β-, $(\alpha+\beta)$- and α-phases. With 15 to 20% Al content, the β-phase is the

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Investigation of the phase...

first to crystallize, which is then partially converted into the α-phase and finally the γ-phase separates itself from the α-phase. With 25% Al the (α+β+γ) region widens and a (β+γ) region occurs. With 30% Al, the γ-phase is separated from the β-phase, which crystallizes first, and then the α-phase is formed due to peritectic transition. With 35% Al the β-phase crystallizes first and is followed by the γ-phase, so that a (β+γ) region is formed. With 40% Al only the γ-phase forms from the melt. In the isothermal cross-section at 1100°C the largest region is the one of the β-phase reaching up to 10% Al. The α-phase, forming a narrow strip is adjacent to the Ti-Al side between 10 and 25% Al. The TiAl-based ternary solid solution, the γ-phase, has only a small region. The maximum solubility of Mo in TiAl is about 11 - 12% at 1100°C. Titanium alloys with less than 12% Al + Mo show martensitic structure after quenching in water. At 800°C the β-region becomes smaller and its boundary is displaced towards the Ti - Mo side. The central part of the cross-section is formed by the (α+β)-phase. At 600°C the (α+β) region and the (α+β+γ) region widen. At this temperature the solubility of molybdenum in the solid α solution is about 1.0%. Between 600 and 1100°C the following phases are in equilibrium with one another: α, β, γ, α+β, α+γ, β+γ, γ+$TiAl_3$, α+β+γ and others. There are 6 figures and 1 table. The English-language references are: H. D. Kessler, Armour

Card 2/3

Research Foundation, Report on Contract No AD 11-022 ORD to Watertown Arsenal, 1951; H. Margolin et al., New York Univ. Eng. Res. Div., Final Report in Watertown Arsenal Laboratory, 1954, on Contract No Da-030-069-ORD-208.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences USSR)

SUBMITTED: June 6, 1962

Card 3/3

GE CHZHI-MIN [Ko Chih-ming] (Moskva); KORNILOV, I.I. (Moskva); PYLAYEVA, Ye.N. (Moskva)

Investigating the structure and properties of alloys in the system titanium - aluminum - molybdenum. Izv.AN SSSR. Otd.tekh.nauk. Met.i topl. no.4:114-118 Jl-Ag '62. (MIRA 15:8)
(Titanium-aluminum-molybdenum alloys--Thermal properties)

40724

S/180/62/000/004/004/009
E040/E435

18.2200
18.8100

AUTHORS: Ko-Chih-Ming, Kornilov, I.I., Pylayeva, Ye.N. (Moscow)

TITLE: Investigation of the structure and properties of titanium-aluminium-molybdenum alloys

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, no.4, 1962, 114-118

TEXT: Using the hot-hardness technique for a rapid assessment of the alloy properties as a function of temperature, an examination was made of the hot-hardness and creep of titanium-corner alloys of the Ti-Al-Mo ternary system along sections parallel to the Ti-Mo side of the concentration triangle at aluminium contents of 0, 5, 10, 15, 20 and 36% and at molybdenum contents from 0 to 10%. The tests were made in ВИМ-1М (VIM-1M) vacuum machine. The test specimens were melted in an arc-furnace with a non-consumable tungsten electrode in an argon atmosphere and were vacuum-annealed at 1100°C for 24 hours, then annealed again for 24 hours at 600°C and finally cooled with the furnace. The hardness (1 kg load) was determined in the interval 20 to 1000°C (in 100°C stages) after a holding time of 1 minute. The

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hardness of titanium and of its alloy with 5% Al dropped progressively with rising temperature, whereas the hardness of alloys with 10, 15 and 20% Al changes little up to about 700 to 800°C. Molybdenum additions have a much less beneficial effect on the hardness of titanium, especially at high temperatures: the hardness of binary titanium alloys with up to 5% Mo decreased with rising temperature. The hardness of titanium remained unchanged as the temperature increased to 500 to 600°C if the molybdenum content was raised to 10%. Studies of the effect of molybdenum additions on the hardness of Ti-Al alloys showed that the hardness at room temperature rises when the Mo content is from 3 to 10%; at higher temperatures the hardness drops. The creep of the alloys was examined at 700°C using a method described previously (Osipov, K.A., T'ien-te-Cheng. Izv.AN SSSR.OTN. M i T., no.4, 1959). Molybdenum concentrations up to 1 - 3% increase the resistance of titanium to plastic deformation at 700°C but this effect disappears almost completely if the molybdenum concentration is raised to 10%. In ternary Ti alloys (with 5, 15 and 20% Al), the highest heat resistance at 700°C was observed in alloys with

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KRIPYAKEVICH, P.I.; GLADYSHEVSKIY, Ye.I.; PYLAYEVA, Ye.N.

Compounds of the type W_6Fe_7 in the systems Ta - Ni and Nb - Ni.
Kristallografiia 7 no.2:212-216 Mr-Ap '62. (MIRA 15:4)

1. L'vovskiy gosudarstvennyy universitet imeni I.Franko.
(Tantalum-nickel-niobium alloys) (Crystallography)

KRIPYAKEVICH, P.I., PYLAYEVA, Ye.N.

Crystal structure of Ta_2Ni. Zhur.strukt.khim. 3 no.1:35-37 Ja-F '62. (MIRA 15:3)

1. L'vovskiy gosudarstvennyy universitet imeni Iv.Franko i Institut metallurgii imeni A.A.Baykova AN SSSR.
(Tantalum-nickel alloys) (Crystallography)

KORNILOV, I.I.; PYLAYEVA, Ye.N.

Phase diagram of the tantalum - nickel system. Zhur.neorg.khim. 7 no.3:590-595 Mr '62. (MIRA 15:3)
(Nickel-tantalum alloys) (Phase rule and equilibrium)

S/598/62/000/007/008/040
D267/D307

AUTHORS: Pylayeva, Ye. N. and Volkova, M. A.

TITLE: Solubility of silicon in α-titanium

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 74-77

TEXT: Seven compositions of binary alloys (Si content range 0.1 - 2 wt-%) were investigated at 850, 800 and 600°C, using the methods of micro-structural analysis and hardness. The alloys obtained by levitation melting were subsequently heat treated. It was found that the solubility of Si in Ti amounts to 0.40 wt-% at 850°C, 0.35 wt-% at 800°C, and 0.30 wt-% at 600°C. The presence of the compound Ti_5Si_3 in alloys with 0.5, 0.75 and 1% Si was borne out by the phase analysis of intermetallic compounds. The increase of Si content increases the hardness and strength of the alloy, with a simultaneous reduction of plasticity. There are 4 figures and 2 tables.

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S/598/62/000/007/011/040
D244/D307

12,1285

AUTHORS: Kornilov, I. I., Pylayeva, Ye. N. and Volkova, M. A.

TITLE: Properties of the alloys of the ternary titanium-aluminum-vanadium system

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 89-94

TEXT: The work is a continuation of previous investigations of Ti-Al and Ti-Al-Fe alloys. In this investigation the heat stability of Ti rich alloys of ternary system Ti-Al-V was investigated. Microstructure of the alloys at 600°C included either one α-phase or two phases α and (α + ß). The alloy with 7.5% Al and 0.5% V had a single phase structure of α-solid solution and the alloy with 7.5% Al and 4% V consisted of (α + ß) phases. The heat stability was determined by the method of centrifugal bending under a tension of 15 kg/mm^2 at 550°C. For alloys containing 5% Al, additions of V from 0.5 to 1% did not decrease their heat stability. Further in-

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creases of V from 5 to 10% led to the formation of two phases α - β, which decreased the heat stability. Influence of V on the alloys with 7.5% Al was similar. A number of alloys was prepared by powder metallurgy and tested for heat stability. The most heat-stable alloys contained 10% Al and 30% V or 15% Al and 15% V. It was shown that the addition of Al (0 - 15%) to the alloys with a constant content of V (2, 3, 4, 5%) increased their heat stability. There are 7 figures.

38697
S/598/62/000/007/018/040
D290/D307

12, 1285

AUTHORS: Kornilov, I. I., Mikheyev, V. S., Pylayeva, Ye. N., Volkova, M. A., Borok, B. A., Shchegoleva, R. P. and Golubeva, L. S.

TITLE: The effect of aluminum on the structure and properties of a Ti-Al-Cr-Fe-Si-B alloy prepared by powder metallurgy

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 130-134

TEXT: The authors studied the effect of varying amounts of Al in Ti-Al alloys (1 - 7% by weight Al) and in alloys of the Ti-Al-Cr-Fe-Si-B system (1.5 - 12% by weight Al) on the structure and properties of the alloys. Strength of the Ti-Al alloys increased from 77.2 to 107-3 kg/mm^2 as the Al content rose from 0 to 7%; the strength of alloy AT4 (AT4) increased from 104 to 142 kg/mm^2 as the Al content rose from 1.5 to 10%. Plasticities of the alloys decreased and the heat resistance of AT4 increased as the aluminum

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contents became higher. The rate of oxidation of AT4 in air at 700°C decreases by about 60% as the Al content rose from 5 to 12% by weight. There are 4 figures and 4 tables.

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3 8698
S/598/62/000/007/019/040
D290/D307

18.1225

AUTHORS: Kornilov, I. I., Pylayeva, Ye. N., Volkova, M. A., Borok, B. A., Shchegoleva, R. P. and Golubeva, L. S.

TITLE: The effect of silicon on the properties of a 6-component alloy of the system Ti-Al-Cr-Fe-Si-B prepared by powder metallurgy

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 136-139

TEXT: The authors studied the effect of varying amounts of silicon in Ti-Si alloys and in alloys of the system Ti-Al-Cr-Fe-Si-B on the properties of the alloys, in order to find the optimum Si concentration in alloy AT4 (AT4). The mechanical properties were measured in both the forged and hot worked conditions. The strength of the Ti-Si alloy increased from 77.2 to 100.8 kg/mm^2 as the Si content increased from 0 - 2% while the strength of the alloy AT4 increased from 110 to 138 kg/mm^2 with the addition of 1.5% Si. Pla-

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S/078/62/007/003/008/019
B110/B138

I.P. 1255

AUTHORS: Kornilov, I. I., Pylayeva, Ye. N.

TITLE: Constitution diagram of the tantalum - nickel system

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 7, no. 3, 1962, 590-595

TEXT: From the results of this study the complete constitution diagram of the binary system tantalum - nickel was constructed. 10 g of tantalum (99.8%) and 10 g of H-C(N-O) nickel were induction melted in suspension in a purified He atmosphere. The resulting alloys were submitted to thermal, microstructural, and X-ray structural analyses, and hardness tests. The solidus temperatures of the Ta-rich alloys were measured on an optical pyrometer, and those of alloy crystallization on a Kurnakov pyrometer and with non contact thermography. The liquidus has six branches: (1) crystallization of the β solid solution on a Ta base; (2) Ta_2Ni; (3) $TaNi$; (4) $TaNi_2$; (5) $TaNi_3$, and (6) α solid solution on a Ni base. The liquidus branches intersecting at 1785, 1570, and 1420°C correspond to the following peritectic equilibria: β + melt ⇌ Ta_2Ni; Ta_2Ni + melt ⇌ $TaNi$; melt + $TaNi_3$

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Constitution diagram of the ...

$\rightleftharpoons TaNi_2$; and at 1320 and 1360°C, to the eutectic reactions: melt $\rightleftharpoons$ TaNi + $TaNi_2$; melt $\rightleftharpoons TaNi_3$ + Ni solid solution. Three new compounds were detected: Ta_2Ni (66.6 atomic % or 86.25 weight % Ta); TaNi (50.0 atomic % or 76.05 weight % Ta); $TaNi_2$ (33.3 atomic % or 60.88 weight % Ta). The microstructure was examined in cast alloys quenched from 1600, 1500, 1400, 1300, and 1200°C (soaking time 100 hrs each), and others annealed for 50 hrs at 1110°C, 100 hrs at 1000°C, and 250 hrs at 800°C. At 94 atomic % Ta after quenching from 1600°C, polyhedra of a solid solution were formed. At 95.89 atomic % Ta and quenching from 1500° a second phase was precipitated within and on the grain boundaries. At 99.62 atomic % Ta and quenching from 1300°C the solid solution began to disintegrate. Ta_2Ni is formed from the peritectic reaction which takes place at 80.10% Ta after quenching from 1300°C. Ta_2Ni (66.6 atomic % Ta) has a dendritic structure in the cast state which changes into polyhedral after prolonged annealing at a high temperature. At 60.44% Ta, there is a peritectic reaction between melt and Ta_2Ni with formation of TaNi. After prolonged annealing TaNi (50 % Ta) assumes a polyhedral structure. A eutectic reaction occurs between TaNi and $TaNi_2$ in the

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Constitution diagram of the ...

alloy with 43.7 % Ta quenched from 1200°C. The alloy with 35.12 % Ta displayed light TaNi grains on the eutectic background. $TaNi_2$ with 33.3% Ta has polyhedral structure after prolonged annealing. The microstructural and thermal analyses thus show that the compounds of the system neither dissolve, nor form solid solutions with their components. X-ray diffraction patterns taken with Cr K_α radiation fitted the microstructural data. Vickers hardness tests were made on cast, annealed and quenched (1200°C) alloys at 10 kg/mm^2. The addition of Ni to Ta increases hardness from 135 (pure Ta) to 847 (cast and annealed). The maxima of 847 and 627 are for Ta_2Ni and TaNi. The minima at 342 and 322, for $TaNi_2$ and $TaNi_3$, but this is still higher than the values for their components: 135 for Ta and 60 for Ni. P. I. Kripyakevich is thanked for his X-ray structural analyses. There are 6 figures, 1 table, and 6 references: 4 Soviet and 2 non-Soviet: The two references to English-language publications read as follows: E. Therkelsen. Metals Alloys, 4 105 (1938). M. Hansen, Constitution of binary alloys, Mc Graw-Hill Book Company. New York, Toronto, London, 1958, p. 1045.

SUBMITTED: March 6, 1961

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33707

S/192/62/003/001/001/002
D258/D303

5.2610 4016

AUTHORS: Kripyakevich, P.I. and Pylayeva, Ye.N.

TITLE: The crystal structure of Ta_2Ni

PERIODICAL: Zhurnal strukturnoy khimii, v. 3, no. 1, 1962, 35-37

TEXT: The authors confirmed by x-ray analysis the existence of $TaNi_2$, TaNi (or a compound with a composition near to it), and Ta_2Ni; they also defined the crystal structure of the latter. The 3 compounds have been identified by I.I. Kornilov and Ye.N.Pylayeva (Ref.5: Zh.neorg.khimii, in press), being formed in the following reactions: (1) $TaNi_2 \rightleftarrows \ell + TaNi_3$ (1420°C); (2) $TaNi \rightleftarrows \ell + Ta_2Ni$ (1570°C); and (3) $Ta_2Ni \rightleftarrows \ell + \beta$ (1770°C), where β is a solid solution of both metals. Specifically, 10g samples of alloys were prepared by induction melting in an atmosphere of purified He. Homogeneous structures and compositions were ensured by firstly, using 99.6% pure Ta and C 00-grade Ni, secondly by

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The crystal ...

avoiding the use of crucibles in melting and thirdly by carefully controlling the composition of charges. The alloys were homogenized for 1000 hrs. at 800°C, prior to their x-ray analysis. The latter proved the existence of the 3 compounds at 8000°C. X-ray powder photography (Cr $K\alpha$ -radiation) of Ta Ni indicated a tetragonal body-centered lattice, with the constants $a = 6.216 \pm 0.005$ Å, $c = 4.872 \pm 0.004$ Å; $c/a = 0.784$. These constants are similar to those of Ta_2Si, thus indicating for Ta_2Ni a structure of the $CuAl_2$ type (space group $I4/mcm - D_{4h}^{18}$; 4Ni in 4(a)00 1/4; 8Ta in 8(h) x, 1/2 + x, 0). x was found to vary from 0.155 to 0.167; it was accurately defined by photometry of lines 411, 402, 332, and 004 and found equal to 0.158. The interatomic distances and coordination numbers are given, as follows:

The crystal ...

Atoms	d(Å)	Coord.no.
Ni-2Ni	2.44)	
8Ta	2.64)	10
Ta-4Ni	2.64)	
1Ta	2.78)	15
2Ta	2.92)	
4Ta	3.31)	

There are 2 tables, 1 figure and 13 references: 4 Soviet-bloc and 9 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: N.Karlsson, J.Inst.Metals, 79, 391 (1951); J.R.Murray, J.Inst.Metals, 84, 4, 91 (1955); P.Duwez and J.L. Taylor, J.Metals, 2, 9, 1173 (1950); and J.S. Kasper and R.M. Waterstrat. Acta crystallogr. 9, 3, 289 (1956).

ASSOCIATION: L'vovskiy gosudarstvenny universitet im. Iv. Franko (Lvov State University im. Iv. Franko); Institut metallurgii

33707

The crystal ...

S/192/62/003/001/001/002
D258/D303

im. A.A. Baykova AN SSSR (Institute of Metallurgy, im. A.A. Baykov, AS USSR)

SUBMITTED: March 2, 1961

Card 4/4

KORNILOV, I.I.; BUDBERG, P.B.; VOLKOVA, M.A.; PROKHANOV, V.F.; PYLAYEVA, Ye.N.

Developing a method of hot pressing of titanium and titanium alloy powders. Titan i ego splavy no. 1:25-32 '58. (MIRA 14:5)

1. Institut metallurgii AN SSSR.
(Titanium—Metallurgy) (Powder metallurgy)

KORNILOV, I.I.; PYLAYEVA, Ye.N.

Equilibrium in the ternary system of themetallides Ni_3Nb - Ni Ti - Ni_3Ta. Izv. AN SSSR. Otd. khim. nauk no.2:197-200 F '61. (MIRA 14:2)

(Nickel compounds) (Tantalum compounds)
(Titanium compounds) (Niobium compounds)

GRUM-GRZHIMYLO, N.V.; KORNILOV, I.I.; PYLAYEVA, Ye.N.; VOLKOVA, M.A.

Metallic compounds in the region of α solid solutions of the system titanium - aluminum. Dokl AN SSSR 137 no.3:599-602 Mr '61. (MIRA 14:2)

1. Institut metallurgii im.A.A.Baykova AN SSSR. Predstavleno akademikom I.I.Chernyayevym.

(Titanium-aluminum alloys)

18.1285 also 1555

21568
S/020/61/137/003/018/030
B103/B208

AUTHORS: Grum-Grzhimaylo, N. V., Kornilov, I. I., Pylayeva, Ye. N., and Volkova, M. A.

TITLE: Metallic compounds in the range of solid α-solutions of the system titanium-aluminum

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 3, 1961, 599-602

TEXT: The authors proved (Ref. 6: Tr. inst. metallurgii AN SSSR, no. 2, 1957) that in titanium - aluminum alloys (7.5-20 wt% Al) the resistance to creeping in bending deformation by the centrifugal method rapidly increases as plasticity decreases. They point out that such a change of properties in the range of solid solutions of the binary system Ti - Al could not be explained by conventional methods of metallographic analysis. The objectives of the present study were therefore the following: 1) investigation of the range of solid α-solution in the Ti - Al system; 2) determination of the nature of phases appearing in it by measuring the Hall effect as a function of the composition of the alloys. The authors have previously proved (Ref. 9: ZhNKh, 2, no. 10, 1957; Ref. 10: ibid,

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Metallic compounds in the range of ...

31, no. 9, 1956) that the galvanomagnetic effects are related to the composition of various alloys in a way that salient points and jumps appear in the diagram composition-versus-Hall effect. This phenomenon can be explained by the fact that the electron states in the outer atomic shells are changed by applying a magnetic field. This affects the behavior of conduction electrons and alters the values of the Hall constant. The galvanomagnetic effects are closely related to the behavior of the electron components of the outer atomic shells. The state of the outer shell may be studied with high accuracy on the basis of these effects. The character of the chemical bond between various atoms of metallic alloys may thus be explained. The authors prepared alloys from pure titanium and aluminum with an Al content up to 40 wt% by two methods: 1) powder metallurgy by pressing and sintering in vacuo at 600-1000°C for 50-100 hr. 2) melting in the arc furnace with a wear-resistant tungsten electrode. The current collectors were triangular and knife-shaped at the point of contact with the specimen. They glided along the polished lateral faces of the sample by means of micrometer screws. Test method and measuring apparatus are described in Ref. 11 (N. V. Grum-Grzhimaylo, ZhNKh, 3, no. 7, 1958). Table 1 contains the resultant mean

Metallic compounds in the range of ...

values of the Hall constant of the alloys. On the basis of these data, the authors plotted a diagram of this constant as a function of the composition (Fig. 1). Two (a and b) jumps from the linear variation of the Hall constant to another linear variation are seen. These jumps correspond to: a) the compound Ti_6Al with 14.3 atom% (9 wt%) of aluminum; b) the compound Ti_3Al with 25 atom% (16 wt%) Al. The sintered and the cast alloys showed the same behavior. The cast alloys were subjected to homogenizing heat treatment (between 600 and 900°C for 200-350 hr) immediately after measuring the Hall constant. The limited range of the solid α-solution offers considerable difficulties in the presence of two metallic compounds if the order of variations of the Hall constant has to be determined. This determination requires an increased precision of measurement which was achieved by the device applied here. The authors conclude from their data that the solid aluminum solutions in α-titanium exhibit a complicated kind of interaction owing to the existence of the two compounds Ti_6Al and Ti_3Al which apparently have a hexagonal lattice. They might result from solid solutions and correspond to compounds of the Kurnakov type (Ref. 12:. I. I. Kornilov, Izv. AN SSSR, OKhN, 1957,

Metallic compounds in the range of ...

no, 4,.395). The diagrams of the Hall constant in the range of the γ-phase in alloys with 46.16 atom% (33wt%) to 53.85 atom% (40.0 wt%) aluminum show a sharp discontinuity at 50.0 atom% (36.02 wt%).aluminum. It corresponds to the compound TiAl which was detected by other methods of physicochemical analysis. The equilibrium of the compounds Ti_6Al, Ti_3Al, TiAl and the proof of their existence in the phase diagram depend on the kinetics and on the conditions of their formation which have to be further studied. The appearance of these compounds in the system Ti - Al increases the heat resistance of the alloys and rapidly decreases their plasticity at an aluminum content of more than 7-8 wt%. There are 1 figure, 1 table, and 12 references: 8 Soviet-bloc and 4 non-Soviet-bloc. The reference to the English-language publication reads as follows: M. Hansen, Constitution of binary alloys, N.Y. London, 1958, p. 139 (Ref. 1).

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences USSR)

S/020/61/137/003/018/030
B103/B208

Metallic compounds in the range of ...

PRESENTED: October 27, 1960, by I. I. Chernyayev, Academician

SUBMITTED: October 7, 1960

Legend to Table 1: 1) Al content, %, 2)-4) Hall constant × 10^{-12} for alloys, 2) sintered, 3) cast, 4) cast and annealed.

Содержание Al, %	Константа Холла × 10^{-12} для сплавов		
	спеченных	литых	литых отожженных
0	0	0	0
4,36	0,082035 ± 0,026	0	
2,5			
8,52	0,223000 ± 0,015	0	
5,0			
10,16	0,268054 ± 0,6141	0,15434 ± 0,0159	0,193491 ± 0,0141
6,0			
12,60	—	0,1170503 ± 0,045	0,293234 ± 0,0178
7,5			
13,45	—	0,2474387 ± 0,185	0,1885845 ± 0,0105
8,0			
14,14	—	0,6823139 ± 0,0139	0,51393 ± 0,139
9,0			
16,51			
10,0	0,562180	0,731783 ± 0,0215	0,7888008 ± 0,170
17,25			
11,0	—	0,5795207 ± 0,0492	1,228163 ± 0,0714
19,57			
12,0	—	—	0,92553

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Metallic compounds in the range of ...

20.0 a			—	
12.5 a	4,45879	± 0,173		
20.94 a		—	2,10910 ± 0,0190	2,000000 ± 0,161
13.0 a				
22.41 a			2,08797 ± 0,157	2,17494 ± 0,0512
14.0 a	3,43710	± 0,170		
23.95 a			4,40500 ± 0,1345	4,387100 ± 0,200
15.0 a	4,115600	± 0,187		
25.10 a			2,76210 ± 0,172	2,750626 ± 0,000
16.0 a	3,867287	± 0,228	2,79800 ± 0,132	
			2,554097	
26.62 a		—		
17.0 a				
27.07 a				
17.0 a	3,0078	± 0,0071		3,00000 ± 0,170
27.51 a				
18.0 a	2,63763	± 0,0162	2,755197 ± 0,0244	
20.0 a				
33.30 a	2,4460	± 0,0200	—	2,218300 ± 0,0000
22.0 a				
34.05 a	2,102906	± 0,043	2,1344000 ± 0,310	2,161163 ± 0,0153
22.5 a				
34.68 a	2,391420	± 0,220		
23.0 a				
35.95 a	2,27879	± 0,0719		
24.0 a				
36.72 a	2,71220	± 0,208		
26.0 a				
39.68 a	1,506357	± 0,0281		
27.5 a				
21.11 a	0,745089	± 0,0264		
30.0 a				
46.16 a		—	0,8478517 ± 0,103	
33.0 a				
50.00 a		—	0,3886150 ± 0,151	
36.0 a				
51.53 a		—	1,172150 ± 0,0518	
38.00 a				
53.85 a		—	1,100276 ± 0,107	
40.0 a				

Tab. 1

Card 6/8

21568

S/020/61/137/003/018/030
B103/B208

Metallic compounds in the range of ...

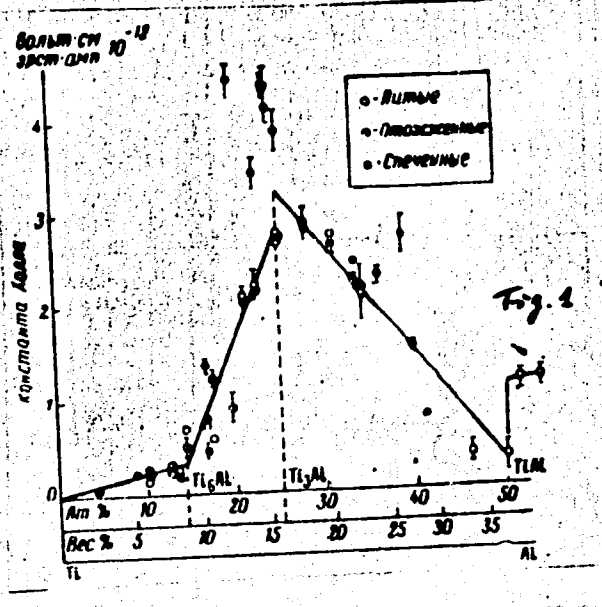

Fig. 1

Card 7/8

Metallic compounds in the range of ...

Legend to Fig. 1: ordinate - Hall constant v.cm; oe.a 10^{-12} ;
o cast, ◒ annealed,
● sintered.

Card 8/8

BJP

89906

S/062/61/000/002/001/012
B115/B207

18.7520 1045, 1454, 1418

AUTHORS: Kornilov, I. I. and Pylayeva. Ye. N.

TITLE: Equilibrium of the ternary system of Ni_3Nb - Ni_3Ti - Ni_3Ta metallides

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, no. 2, 1961, 197-200

TEXT: The authors studied the equilibrium of the ternary system of the metallic compounds Ni_3Nb - Ni_3Ti - Ni_3Ta by physicochemical analysis (Fig. 1). In a previous study of binary systems consisting of Ni_3Nb - Ni_3Ta, Ni_3Nb - Ni_3Ti, Ni_3Ta - Ni_3Ti, the authors proved the existence of continuous, solid solutions by way of physicochemical analysis. On the basis of X-ray analysis, they determined the isostructural character of the compounds Ni_3Nb and Ni_3Ta. They are ascribed to the rhombic syngony of the structural type β - Cu_3Ti, and form continuous, solid solutions between each other. The complete

Card 1/8

Equilibrium of the ternary system ...

solubility of Ni_3Ti - Ni_3Ta - Ni_3Nb indicates, for the compound Ni_3Ti, the possible existence of a second high-temperature modification of the β - Cu_3Ti type rhombic syngony, as it is the case with the compounds Ni_3Nb and Ni_3Ta. The authors stress that no published data exist on the equilibrium in the mentioned ternary system, apart from a brief mention of the possibility of formation of continuous, solid solutions. Fig. 2 shows the composition of the alloys studied. A table provides data on the thermal analysis and the stability of alloys of the ternary system. The authors plotted the liquidus surface of the ternary system on the basis of thermal analysis data of three binary systems formed by the compounds, and of the three polythermal cross sections of the ternary system. The liquidus surface consists of a field of primary crystallization of continuous, ternary solid metallide solution of the system Ni_3Nb + Ni_3Ta + Ni_3Ti. Microstructural analyses of cast and annealed alloys confirm the existence of solid solutions in the ternary system. Fig. 6a shows the cast (mostly dendritic) structure of the

Equilibrium of the ternary system ...

alloy: 15% Ni_3Nb, 15% Ni_3Ta, and 70% Ni_3Ti. Fig. 6b - of the alloy: 17% Ni_3Nb, 33% Ni_3Ti, 50% Ni_3Ta, and Fig. 6c - of the alloy: 12% Ni_3Nb, 70% Ni_3Ta, 18% Ni_3Ti. The microstructure of alloys of the same composition has become polyhedral after annealing at 1200°C for 24 hr (Figs. 6d, e, f). Finally, the authors studied the hardness in the cast and the annealed state. The table shows the results of measurements of polythermal cross sections. Not only microstructure, but also hardness confirm the data of thermal analysis on the existence of continuous, solid solutions of metallides in the ternary system. There are 7 figures, 1 table, and 7 Soviet-bloc references.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov, Academy of Sciences USSR)

SUBMITTED: October 2, 1959

89906

S/062/61/000/002/001/012
B115/B207

Equilibrium of the ternary system ...

1. Состав по синтезу, вес. %			2. Температура кристаллизации, °С	3. Твердость H_V, кг/мм²		6. Обозначение разрезов
Ni_3Ti	Ni_3Ta	Ni_3Nb		4. литые сплавы	5. отожженные сплавы	
100	0	0	1375	433	417	7. Лучевой разрез 1 : 1
90	5	5	1320	446	425	
80	10	10	1320	459	400	
70	15	15	1360	450	375	
60	20	20	1370	442	405	
50	25	25	1350	459	—	
40	30	30	1400	493	401	
30	35	35	1380	—	442	
20	40	40	1400	468	401	
10	45	45	1410	450	—	
0	50	50	1440	442	410	
80,0	0	20	1300	—	—	8. Разрез m_1—m_3
77,0	10	13	1370	370	—	
73,0	20,0	7,0	1370	366	—	
70,0	30,0	0	1380	356	—	

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9905

S/062/61/000/002/001/012
B115/B207

Equilibrium of the ternary system ...

62,0	28	10,0	1420	376	—	Разрез m_8—m_9
55,0	25,0	20,0	1400	376	—	
47,0	23,0	30,0	1340	376	—	
40,0	20,0	40,0	1420	237	—	
33,0	17,0	50,0	1330	397	—	
25,0	15,0	60,0	1380	376	—	
18,0	12,0	70,0	1370	397	—	
11,0	9,0	80,0	1380	443	—	
6,0	4,0	90,0	1300	336	—	
0	5	95	1320	—	—	

Legend to the table: 1) Composition according to synthesis, % by weight, 2) crystallization temperature, °C, 3) hardness H_V, kg/mm^2, 4) cast alloys, 5) annealed alloys, 6) designation of cross sections, 7) radiation cross section, 8) cross section

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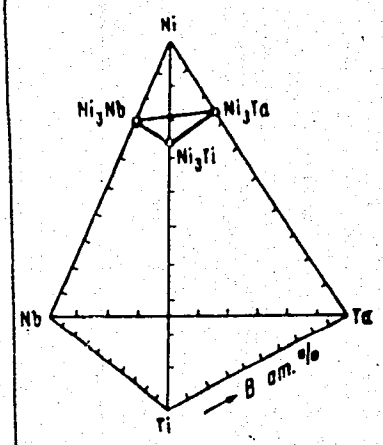
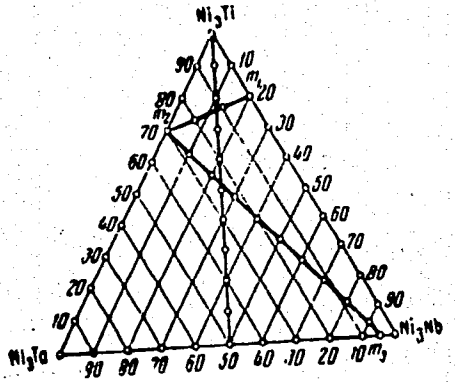
89906

S/062/61/000/002/001/012
B115/B207

Equilibrium of the ternary system ...



Фиг. 1. Четверная диаграмма состояния Ni—Nb—Ti—Ta



Фиг. 2. Составы изученных сплавов системы Ni_3Nb—Ni_3Ti—Ni_3Ta

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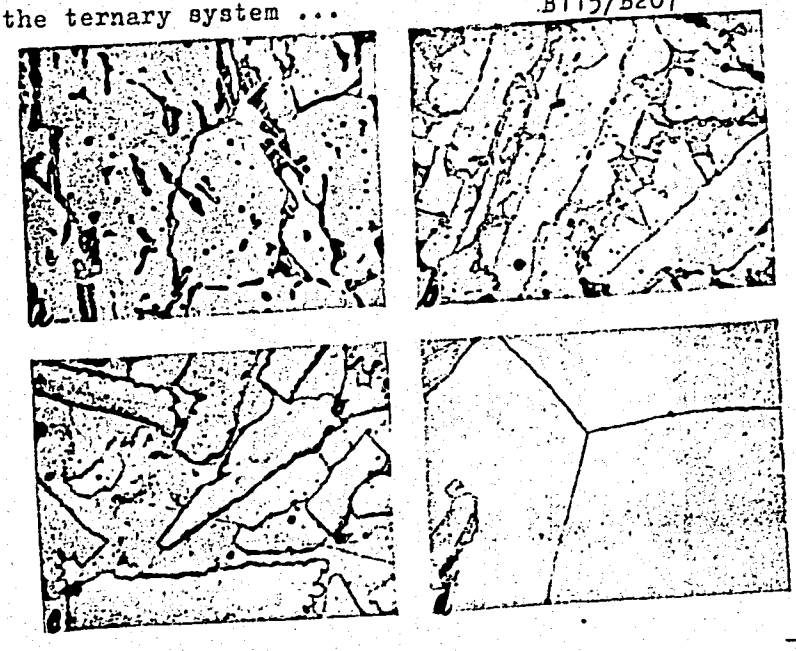
S/062/61/000/002/001/012
B115/B207

Equilibrium of the ternary system ...

Фиг. 6



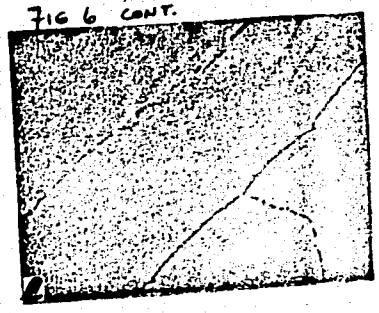
Card 7/8

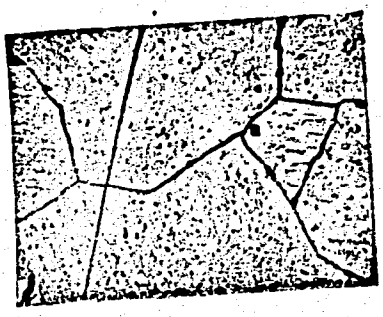
89906

S/062/61/000/002/001/012
B115/B207

Equilibrium of the ternary system ...

Fig 6 cont.





X

Card 8/8

PYLAYEVA, Ye.N.

18(2) PHASE II - ABSTRACTS AB-1

Akademiya nauk SSSR. Institut metallurgii

Titan i yego splavy; metallurgiya i metallovedeniye (Titanium and Its Alloys; Metallurgy and Physical Metallurgy) Moscow, Izd-vo AN SSSR, 1958. 209 p. 4,000 copies printed.

Resp. Ed.: N.V. Ageyev, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: V.S. Rzheznikov; Tech. Ed.: A.A. Kiseleva.

INTRODUCTION: This book, of which a Phase I Exploitation (SOV/1200) has been prepared, is a collection of scientific papers devoted to the study of titanium and its alloys from three main points of view: physical metallurgy, forming, and welding. Special problems investigated include structural changes occurring during welding, determination of the content of harmful gases, development of industrial methods of rolling, and oxidation at various temperatures.

PART I. PHYSICAL METALLURGY

Ageyev, N.V., and L.A. Petrova (Institute of Metallurgy, USSR Academy of Sciences). Stability of the Beta Phase in Titanium-Molybdenum Alloys 3

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decrease in lattice parameter. 4) Formation of the omega phase during the decomposition of the beta phase causes an increase in hardness in the investigated alloys, and is also the cause of brittleness observed in alloys containing 5.42-6.93 percent of Mn after heating in the 500-200° range, with holding times of 6-16 hours. Precipitation of the alpha phase is accompanied by a drop in hardness. There are 8 figures, 2 tables, and 5 references (1 Soviet and 4 English).

Kornilov, I.I., P.B. Budberg, M.A. Volkova, V.F. Prokhanov, Ye.N. Pylayeva (Institute of Metallurgy, USSR Academy of Sciences) Development of a Method for the Hot Compaction of Titanium and Titanium-Alloy Powders 25

The purpose of this investigation was to develop a satisfactory method of hot-compacting titanium powder. The authors first attempted hot compaction with graphite compression molds, which, however, proved unsatisfactory because the titanium reacts with the graphite and the molds can be used only once. The authors therefore used a new complex nickel alloy [composition not given] developed at the Institute of Metallurgy at the USSR Academy of Scineces in 1953-54. This alloy is some 40-50 times stronger than pure Ti at 950-1000° C. The alloy can therefore be recommended as

a material for compression molds for hot compaction of powdered Ti, Be, Zr, Ni, Fe, Th, U, and other metals. Compression molds of the new alloy were made in the following shapes and sizes: 1) cylindrical, with 15-mm diameter, 20-mm height, and 15-g weight; (2) cylindrical, with 45-mm diameter, 60-mm height, and approximately 400-g weight; (3) rectangular, 6x6x60 mm, 10 g in weight. These molds were designed by one of the authors (V.F. Prokhanov). A study was made of the effect of temperature, specific pressure, and duration of hot compaction on the density and hardness of the compact. Hot compaction of CaH_2-reduced and Mg-reduced Ti was carried out at 800°, 850°, and 900° C, at a specific pressure of 15 kg/mm^2, and for periods of 0.5 to 30 minutes. An investigation was also made of the hot compaction of Ti alloys containing 5 percent and 7.5 percent of Al. These tests were carried out at a temperature of 850° and at a specific pressure of 15 kg/mm^2 after preliminary sintering at 1000°. Conclusions. 1) The new heat-resistant nickel alloy may be used for making compression molds intended for hot compaction of metal powders at temperatures of 800-1000° C and at a specific pressure of 12-15 kg/mm^2. 2) It was established that the theoretical density of Ti is achieved by hot compaction

with a specific pressure of 15 kg/mm^2 at 900° after 10 minutes, at 850° after 20 minutes, and at 800° after 30 minutes. 3) In the case of powdered titanium-aluminum alloys containing 5 percent and 7.5 percent of aluminum, hot compaction at 850° with a specific pressure of 15 kg/mm^2 for a period of 20 minutes is sufficient to obtain a density equal to 98 percent of the theoretical density of the alloys. 4) The proposed method of hot compaction may be used for other powdered metals (Zr, Be, Th, U, Fe, etc.) and for their alloys. There are 5 figures, 3 tables, and 10 references (8 English and 2 German).

Savitskiy, Ye.M., M.A. Tylkina, A.N. Turanskaya (Institute of Metallurgy, USSR Academy of Sciences) Recrystallization Diagrams of Titanium and Its Alloys 33

The aim of this investigation, conducted in 1954-55, was to study the process of recrystallization of titanium of various degrees of purity and of its alloys under conditions of various types of deformation and to construct two types of three-dimensional diagrams of the recrystallization process. Type I diagrams show the relationship between grain size, the degree of cold working, and the temperature of subsequent annealing, and can be used in establishing correct conditions for the annealing of semifinished

78-3-3-22/47

AUTHORS: Kornilov, I. I., Pylayeva, Ye. N.

TITLE: Investigations of the Binary Systems Ni_3Ti-Ni_3Ta and Ni_3Ti-Ni_3Nb (Issledovaniye dvoynykh sistem Ni_3Ti-Ni_3Ta i Ni_3Ti-Ni_3Nb) The Binary System Ni_3Ti-Ni_3Ta (Dvoynaya sistema Ni_3Ti-Ni_3Ta)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 3, pp. 673-677 (USSR)

ABSTRACT: In the present work the phase diagrams of the binary systems Ni_3Ti-Ni_3Ta and Ni_3Ti-Ni_3Nb were investigated. The phase diagrams of the binary systems between metallic compounds were determined by thermal analysis, microstructure analysis as well as investigations of the electric resistance, the hardness and the specific weight. On the basis of these investigations the phase diagrams were constructed. The compound Ni_3Ti crystallizes at 1375°C and the compound Ni_3Ta at 1531°C. The temperature of the crystallization of the alloys in the

Card 1/2

Investigations of the Binary Systems Ni_3Ti-Ni_3Ta and Ni_3Ti-Ni_3Nb. The Binary System Ni_3Ti-Ni_3Ta

system Ni_3Ti-Ni_3Ta is lower than in pure compounds. The fusion diagram in the system Ni_3Ti-Ni_3Ta represents an uninterrupted series of solid solutions between the compounds and the minimum crystallization temperature lies at 30 % Ni_3Ta. The microstructure of the alloy in the state of equilibrium (after 200 hours treatment at 1200°C) shows polyhedral crystals. The fusion diagram of the system Ni_3Nb-Ni_3Ti is based on the thermal analysis, the determination of the microstructure, the hardness, the electric resistance and the specific weight of the alloys. The melting point of the compound Ni_3Nb lies at 1410°C. By addition of Ni_3Ti to the compound Ni_3Nb at 70 % Ni_3Ti the minimum of the melting point is 1285°C. There are 3 figures, 2 tables, and 11 references, 9 of which are Soviet.

ASSOCIATION: Institut metallurgii im. A. A. Baykova, Akademii nauk SSSR (Metallurgical Institute imeni A. A. Baykov, AS USSR)

SUBMITTED: June 25, 1957

Card 2/2

PYLAYEVA, Ye.N.; GLADYSHEVSKIY, Ye.I.; KRIPYAKEVICH, P.I.

Crystalline structure of Ni_3Nb and Ni_3Ta compounds. Zhur. neorg. khim. 3 no.7:1626-1631 Jl '58. (MIRA 11:9)

1. Institut metallurgii im. A.A.Baykova AN SSSR i L'vovskiy gosuniversitet im. I. Franko.
(Nickel niobide) (Nickel tantalide)

L 15329-66 EWT(d)/EWT(m)/EWP(v)/T/EWP(k)/EWP(h)/EWP(l) DJ
ACC NR: AP6001006 (N) SOURCE CODE: UR/0286/65/000/022/0077/0077

AUTHORS: Pylaykin, P. A.; Khirdzhiyev, S. G.

ORG: none

32
B

TITLE: Hydraulic cylinder. Class 47, No. 176470 [announced by Scientific Research Construction Technological Institute of Heavy Machine Construction of Uralmashzavod (Nauchno-issledovatel'skiy konstruktorsko-tekhnologicheskiy institut tyazhelogo mashinostroyeniya Uralmashzavod)]

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 22, 1965, 77

TOPIC TAGS: hydraulic device, hydraulic equipment

ABSTRACT: This Author Certificate presents a hydraulic cylinder including a case with a flange mounted on a fixed support by means of a ring. To decrease the stress at the support points of the flanges, to increase the reliability of the cylinder mounting, and to increase the wear resistance, an elastic element is placed between the outer surface of the case flange and the inner surface of the fixed support (see Fig. 1). To ensure the mechanical properties of the elastic element capable of withstanding the pressure of the working medium in the cylinder, the elastic element is reinforced.

14

Card 1/2

UDC: 621-222.1 621.888.6

L 15329-66
ACC NR: AP6001006

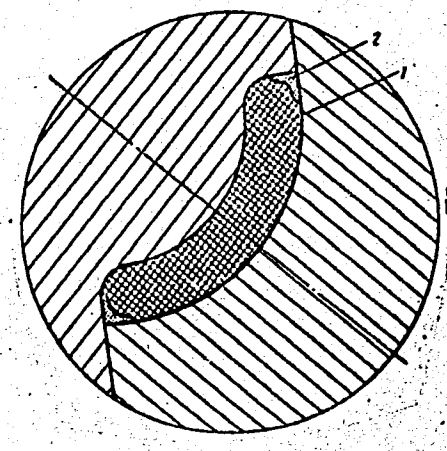


Fig. 1. 1 - Elastic element; 2 - reinforcing.

Orig. art. has: 1 diagram.

SUB CODE: 13/ SUBM DATE: 220ct64

Card 2/2 mnb

ACCESSION NR: AP4011134 S/0182/64/000/001/0021/0024

AUTHORS: Grinshpun, L. Ya.; Pylaykin, P. A.; Khirdzhiyev, Ye. V.; Pertsovskaya, Yo. V.

TITLE: Containers of high power horizontal hydraulic presses for pressing aluminum alloys

SOURCE: Kuznechno-shtampovochnoye proizvodstvo, no. 1, 1964, 21-24

TOPIC TAGS: hydraulic press, press container, 5KhNV steel, 5KhNM steel, 5KhNM2 steel, 38Kh2N3M steel, 3Kh2N2MVF steel, 27Kh2N2MVF steel

ABSTRACT: The technological requirements of containers for pressing Al alloys were limited by the temperatures up to 430C, specific stresses up to 50 kg/mm^2, and the maximum press force 12 000 T. A commonly used container consisted of a frame and a conical bushing. Both the frame and the bushing were made of high-alloy steels 5KhNV or 5KhNM. They had a number of shortcomings associated with the shape of the bushing and the metal used. For this reason, several research projects leading to the design of more suitable containers were undertaken at

Card 1/3

ACCESSION NR: AP4011134

the Uralmashzavod (Ural Machine Plant). The new types had multilayer frames and cylindrical bushings (see Fig. 1 of the Enclosure). The problem of obtaining steels with high mechanical properties ($\sigma_t \geq 150$ kg/mm^2) at 480C has not yet been solved. The steels studied so far were: 5KhNM2, 38Kh2N3M, 3Kh2N2MVF and 27Kh2N2MVF. A standard mathematical procedure for calculating the strength of a multilayered thick-wall cylinder subjected to internal pressure is presented. Orig. art. has: 1 table, 3 figures, and 2 formulas.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 14Feb64 ENCL: 01

SUB CODE: MM NO REF SOV: 000 OTHER: 000

Card 2/3

EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(l)

ACC NR: AP6023891 SOURCE CODE: UR/0182/66/000/006/0026/0027

17
16

AUTHOR: Pylaykin, P. A.

ORG: none

TITLE: A new design solution for the crosshead of a four-column press

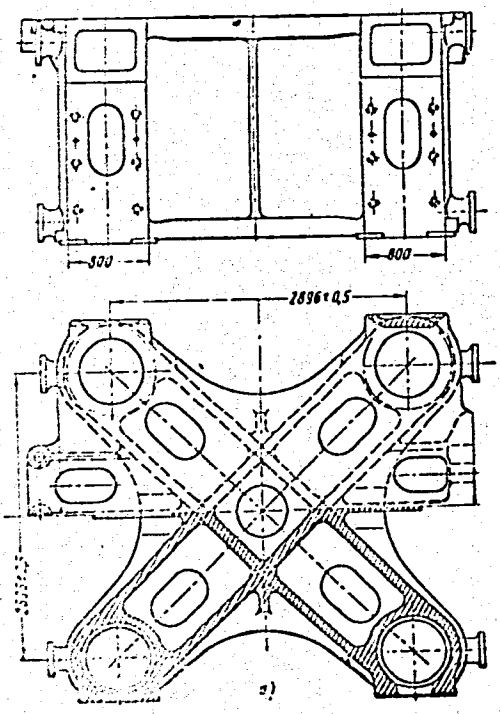
SOURCE: Kuznechno-shtampovochnoye proizvodstvo, no. 6, 1966, 26-27

TOPIC TAGS: forge press, metal forming press, box beam, foundry equipment

ABSTRACT: The Uralmashzavod Machinery Plant has recently developed a new design of crossheads for four-column forging and stamping presses with capacities of up to 7000 tons, as exemplified by the lower crosshead of a 7000-ton stamping press shown in Fig. 1. This design displays the following advantages over the conventional press crossheads: it is formed by two crossed diagonal box beams, and it assures a statically determinate energy diagram. The walls of the beams lack the apertures customarily required for fixing and centering the mold cores and treating the blowholes; such apertures sharply weaken the loadbearing strength of the design; in the new design the side walls of the beams have been left open for this purpose. In addition, the box-like cross section of the crosshead enables it to withstand the torque that

UDC: 621.733.543.3-82

Card 1/3



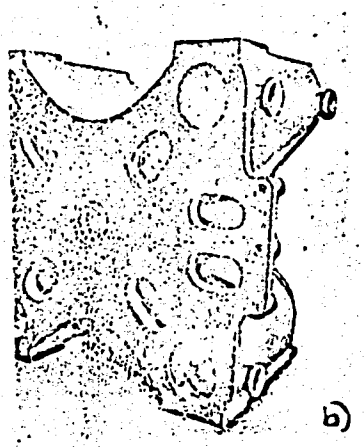


Fig. 1. Lower crosshead of a 7000-ton stamping press

may arise as a result of eccentric loading of the press and thus to avoid fracture. Since in a crosshead designed according to a statically determinate energy diagram all the cross sections calculated in theory, the permissible bending stresses which it can withstand are higher than for crossheads with statically indeterminate energy diagrams, and the weight is about 1.5 times lower. This makes it possible to expand the range of its applications. Orig. art. has: 2 figures.

SUB CODE: 13 / SUBM DATE: none

PYLAYKIN, S.

Using tractor hinges for assembling semiframes. Sel'.stroi. 18 no.11:17 N '63. (MIRA 17:3)

1. Starshiy inzh. Penzenskoy mezhkolkhoznoy stroitel'noy organizatsii.

PYLAYKIN, S.

How brick is fired on the "Bol'shevik" State Farm.
Sel'. stroi. 15 no.3:21-22 Mr '60. (MIRA 16:2)

1. Starshiy inzhener otdela stroitel'stva Penzenskogo oblastnogo upravleniya sel'skogo khozyaystva.
(Serdobsk District--Brickmaking)

ACC NR: AP7003551 SOURCE CODE: UR/0023/66/000/004/0519/0530

AUTHOR: Pyldmaa, V.

ORG: Institute of Physics and Astronomy, Academy of Sciences, Estonian SSR (Institut fiziki i astronomii Akademii nauk Estonskoy SSR)

TITLE: The importance of multiple scattering in twilight

SOURCE: AN EstSSR. Izvestiya. Seriya fiziko-matematicheskikh i tekhnicheskikh nauk, no. 4, 1966, 519-530

TOPIC TAGS: twilight, light scattering, earth atmosphere, ~~sky brightness~~, SOLAR RADIATION, SOLAR RADIATION SCATTERING

ABSTRACT: The effect of high-order scattering on the brightness of the twilight sky is described. The brightness of the sky in absolute units of energy was measured by the author in 1963 in three narrow spectral ranges (λ = 422; 479; 574 mμ). The dependence of total sky brightness on the Sun's vertical is found for three directions: in the zenith by G. Rosenberg's method, and in directions z = $\pm$70° by V. Fesenkov's precisely defined method. The changes in sky brightness caused by the first (I_1), and by higher-order (I_2) scattering as a function of the Sun's zenithal distance ℓ are examined. The peculiarities of the change of the relation I_2/I_1 in different phases of twilight are analysed. The brightnesses I_1 and I_2 in different regions of the spectrum for different zenith distances of the Sun are compared. The dependence of the color index on ℓ is analysed. It is also shown that changes in the spectral composition of diffuse radiation of the twilight sky

Card 1/2

ACC NR: AP7003551

are caused by the mutual effect of the radiation-absorbing influence of ozone and of alteration in the altitude of the high-order scattering layer. Orig. art. has: 9 formulas and 9 figures.

SUB CODE: 04/ SUBM DATE: 02Mar66/ ORIG REF: 009/ OTH REF: 002/

Card 2/2

PYLDMAA, V. [Põldmaa, V.]

Spectrophotometer for airglow observation. Izv. AN Est. SSR. Ser. fiz.-mat. i tekh. nauk 13 no.3:192-199 '64.
(MIRA 17:11)

1. Academy of Sciences of the Estonian SSR, Institute of Physics and Astronomy.

PYLDMAA, V.K. [Põldmaa, V.]

Interpretation of some characteristics of the brightness picture of a twilight sky. Izv. AN SSSR. Fiz. atm. i okeana 1 no.11:1168-1177 N '65. (MIRA 18:12)

1. Institut fiziki i astronomii AN Estonskoy SSR. Submitted May 29, 1965.

AP5028356

AUTHOR: Pyldmaa, V. K. 44,55

SOURCE CODE: UR/0362/65/001/011/1168/1177

ORG: Institute of Physics and Astronomy, Academy of Sciences, EstSSR (Institut fiziki i astronomii, Akademiya nauk EstSSR) 44,55

TITLE: Interpretation of some characteristics of the brightness distribution of the twilight sky

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 1, no. 11, 1965, 1168-1177

TOPIC TAGS: twilight, atmosphere optics, spectrophotometry, atmospheric transparence, sky brightness 12,44,55

ABSTRACT: The changes in the extreme values of sky brightness, in the case of solar zenithal angles are from 90 to 100°, are discussed on the basis of the theory of twilight developed by G. V. Rosenberg. The results are then compared with the photometric measurements of sky brightness in three regions of the spectrum. The spectral transparency of the atmosphere must be known in order to interpret the photometric data of the twilight sky. However, during twilight, neither the Sun which is already beyond the horizon, nor the stars which are not yet sufficiently bright on the background of twilight sky can be used. G. V. Rosenberg therefore proposes a method for determining atmospheric transparency based on the distribution of the brightness of

Card 1/2

UDC: 551.593.55

0701/231

L 4972-66

ACC NR: AP5028356

the twilight sky along the meridian parallel to the vertical of the Sun. After analyzing this method, the author concludes that it can be recommended for determining the spectral transparency of the atmosphere in cases when $30 \leqslant z \leqslant 60°$ and $90° \leqslant \zeta \leqslant 96°$ and, apparently, when $\zeta \geqslant 100°$. Orig. art. has: 6 figures and 19 formulas. [JJ]

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TITLE: Some results of twilight sounding of the atmosphere and of a study of its possibilities

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 2, no. 8, 1966, 820-834

TOPIC TAGS: twilight, upper atmosphere, atmospheric optics, atmospheric sounding, optic brightness, light scattering

ABSTRACT: The purpose of the investigation was to compare directly various methods of solving the inverse problem of twilight theory (the determination of the variation of the scattering coefficient of air in the stratosphere and in the mesosphere from an analysis of the variation of the brightness of the twilight sky) and to assess the role played by multiple scattering of light in the brightness makeup of the twilight sky. To this end, the authors have analyzed their previously published observations (Izv. AN ESSR, ser. fiz.-mat. i tekhn. nauk v. 13, no. 3, 1964 and in Radiatsionnyy pritok tepla v atmosfere [Radiative Influx of Heat in the Atmosphere], IFA AN ESSR, 1966), pertaining to different observation directions, and derived on this basis the most reliable way of obtaining the altitude variation of the scattering coefficient, of specifying more accurately the information required for this purpose, and of esti-

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